CHAPTER 3

RESEARCH METHODOLOGY

3.1 RESEARCH OBJECTIVES

Based on the proposed research model, the objectives of the present study are restrained to:

1. Evaluate the impact of service quality on Customer Satisfaction and loyalty in India’s Post Office Savings banking sector.

2. Find the service quality gap between Expectation and Perception of customer towards SERVQUAL dimensions in India’s Post office savings banking sector.

3. Analyze the association between the demographic profiles of the customers with the service quality factors of SERVQUAL for expectation and perception in India’s Post Office Savings banking sector.

4. Analyze the association between the demographic profiles with overall service quality in India’s post office savings Banking sector.

5. Analyze the association between the demographic profiles with the customer satisfaction and loyalty in India’s post office savings banking sector.
6. Propose a model to evaluate the impact of service quality factors of SERVQUAL on customer satisfaction and loyalty in India’s post office savings banking sector.

3.2 FORMULATION OF HYPOTHESIS

The following hypotheses were formulated for this study.

H₁ : There is a significant association found between the demographic profile of the customers and the Service quality Factors of SERVQUAL.

H₂ : There is a significant association found between the demographic profile of the customers and the customer satisfaction.

H₃ : There is a significant association found between the demographic profile of the customers and the customer loyalty.

H₄ : There is a significant association found between the service quality factors and the customer satisfaction.

H₅ : There is a significant association found between the service quality factors and the customer loyalty.

H₆ : There is a significant difference found between the customers expectation and perception level of service quality.

3.3 RESEARCH METHODOLOGY

Research Methodology is a way of scientifically and systematically solving the research problem and gaining of new knowledge in connection with logic behind the methods. It exhibits the plan of a research process which will be carried out during the period of research. It includes research
design, collecting data, processing and analyzing data and drawing conclusions

3.3.1 Research Design

A Research design is the overall plan and arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure (Kothari 1985). In other words, it is a conceptual structure within which the research is conducted to constitute the blue print for the collection, measurement and analysis of data. Research design of present study constituted formulation of primary and secondary objectives, Methods of data collection, selection of sample, collection of data, processing and analysis of data and reporting of research findings.

3.3.2 Scope of the Study

The main purpose of this study is to evaluate the impact of service quality on customer satisfaction and loyalty in India’s Post Office savings Bank sector, a primeval and extensive network based sector in Indian banking sector having a network of 1,55,000 branches operating throughout the country with 90% of its offices in Rural areas. Being an empirical study, this research is restricted to Salem district in Tamilnadu and the Post office savings bank functioning in all the Taluk of the Salem District have been considered for this study and customers pertaining to the above sector were selected for this study.

3.3.3 Population

Population plays a significant role in determining the sample design. Since the present study is confined to evaluate the service quality and
its impact on customer satisfaction and loyalty in India’s Post office savings banking sector mainly in Salem District empirically, customers those who are having experience and doing business in the sector taken up for consideration were defined as population for this study.

3.3.4 Sampling Procedure

A sample design is a definite plan for obtaining a sample from the given population. It refers to the technique or the procedure the researcher would adopt in selecting items for the sample. It may lay down the number of items to be included in the sample. While sampling procedure is carried out, it should be noted that there is no systematic bias and sampling error and should result in a truly representative sample.

As the primary objective of this study is evaluating service quality and its impact on customer satisfaction and loyalty in India’s Post office savings banking sector empirically in Salem District of Tamilnadu, the branches of the above sector in the entire district were taken into consideration. As on 30th September 2012, the total population in this sector was 7,61,532 customers. Having known population, requirement of sample size was calculated and found to be 397 respondents. In order to get refined result, a total of 550 respondents are considered and convenience sampling is used to assess the opinions of the customers regarding perceived service quality, customer satisfaction and loyalty and the questionnaires are distributed among them. Out of the above, only 482 questionnaires are returned and found to be in reusable level resulting in a response rate of 87.64 percent. Data collected through the questionnaire has been analyzed to fulfill the objectives of this study.
3.3.5 Construct Development

The relevant concept in connection with the present study have been identified after undergone a detailed literature review in the field of Service quality, Customer Satisfaction and Customer loyalty and impact among them and the questionnaire has been designed based on the research gap identified. SERVQUAL Scale having dimensions like Tangibility, Reliability, Responsiveness, Assurance, Empathy was applied so as to find the service quality gap along with an additional dimension „Competence’ in order to measure the competency level of organization due to external and internal factors in its business environment. In addition, 5 variables for customer satisfaction and 5 variables for customer loyalty have also been included in the questionnaire.

The questionnaire is divided into four major parts. The first part of the questionnaire deals with the demographic profile of the customers which include status of the area of residence, Age, Gender, Educational Qualification, Type of the family, Number of dependents,, Marital status, Number of Earning Members, Monthly Income, Earning members, Occupation, Mode of knowing about the scheme of the Post office, Type of account and Frequency of visit to post office savings banking sector.

The second part of the questionnaire deals with the SERVQUAL Scale dimensions consist of 27 variables separately for Expectation and Perception of Service quality in order to identify the Service quality gap and the respondents were asked to rate all the statement with 5 point Likert scale ranging from 1-(Strongly Disagree) to 5 –(Strongly Agree).
3.3.6 Pre Test

In order to test the reliability of the variables considered in this study and to find the appropriateness of the scale used, data collected from the sample of 100 customers were tested with Cronbach alpha test of reliability which provides a value of 0.928 for Expectation and 0.893 for Perception which are more than the acceptable value of 0.70 (Nunnally 1978) and thereby inveterate that the variables included in the dimensions of SERVQUAL and the scale selected for this study were highly reliable and reflected positive relationship among them.

3.3.7 Data Collection

In order to fulfill the proposed research objectives, primary data were collected from the respondents through a well designed questionnaire by explaining the purpose of survey through convenience sampling method. In order to understand better, questionnaire was framed in English and in the respective local language so that customers can acquire clear information about its content.

3.3.8 Framework of Analysis

With the available data collected from the employees, the appropriate statistical tools have been selected on the basis of the objectives of the study and the nature of the data. The included statistical analyses are given below:

1) Structural Equation Model

Structural Equation Modeling (SEM) is a statistical methodology that takes a confirmatory approach to the analysis and it is schematically
portrayed with geometric symbols. Within the graphical display of the model there are boxes and arrows. Boxes represent observed data and the arrows represent assumed causation.

When interpreting SEMs the values attached to one-way arrows (or directional effects) are regression coefficients, whereas two-way arrows (nondirectional relationships) are correlation coefficients; regression coefficients and correlations comprise the “parameters” of the model. The regression coefficients and correlations measure the strength of the relations between the variables. A regression coefficient of 0.70 or higher indicates a very strong relationship; 0.50 to 0.69 indicates a substantial relationship; 0.30 to 0.49 indicates a moderate relationship; 0.10 to 0.29 indicates a low relationship; 0.01 to 0.09 indicates a negligible relationship; and a value of 0 indicates no relationship.

2) Comparative Fit Index

The Comparative Fit Index (CFI) (Bentler 1990) is given by.

$$
\text{CFI} = 1 - \frac{\max \left( \hat{C} - \hat{d}, 0 \right)}{\max \left( \hat{C}_b - \hat{d}_b, 0 \right)} = 1 - \frac{\text{NCP}}{\text{NCP}_b}
$$

(3.1)

where \( \hat{C}, \hat{d} \), and NCP are the discrepancy, the degrees of freedom and the noncentrality parameter estimate for the model being evaluated, and \( \hat{C}_b, \hat{d}_b \) and NCP\(_b\) are the discrepancy, the degrees of freedom and the noncentrality parameter estimate for the baseline model.
3 **Normed Fit Index**

The Normed Fit Index (NFI) as explained (Bentler and Bonett 1980), or Δ₁ in the notation (Bollen 1989) of can be written as:

\[
\text{NFI} = \Delta_1 = 1 - \frac{\hat{C}}{\hat{C}_b} = 1 - \frac{\hat{F}}{\hat{F}_b}
\]  

(3.2)

where \( \hat{C} = n\hat{F} \) is the minimum discrepancy of the model being evaluated and \( \hat{C}_b = n\hat{F}_b \) is the minimum discrepancy of the baseline model.

**Rule of thumb**

"Since the scale of the fit indices is not necessarily easy to interpret (e.g., the indices are not squared multiple correlations), experience will be required to establish values of the indices that are associated with various degrees of meaningfulness of results. In our experience, models with overall fit indices of less than .9 can usually be improved substantially. These indices, and the general hierarchical comparisons described previously, are best understood by examples referring to both the Normed Fit Index and the Tucker-Lewis Index.

4 **Relative Fit Index**

The Relative Fit Index (RFI (Bollen 1986) is the derivative of NFI and given by

\[
\text{RFI} = \rho_1 = 1 - \frac{\hat{C}}{\hat{C}_b / d_i} = 1 - \frac{\hat{F}}{\hat{F}_b / d_b}
\]  

(3.3)
where \( \hat{C} \) and \( d \) are the discrepancy and the degrees of freedom for the model being evaluated, and \( \hat{C}_b \) and \( d_b \) are the discrepancy and the degrees of freedom for the baseline model. The RFI is obtained from the NFI by substituting \( F/d \) for \( F \). RFI values close to 1 indicate a very good fit.

5 Incremental Fit Index

Incremental Fit Index (IFI) (Bollen 1989) is given by

\[
\text{IFI} = \Delta_2 = \frac{\hat{C}_b - \hat{C}}{\hat{C}_b - d} \tag{3.4}
\]

where \( \hat{C} \) and \( d \) are the discrepancy and the degrees of freedom for the model being evaluated, and \( \hat{C}_b \) and \( d_b \) are the discrepancy and the degrees of freedom for the baseline model. IFI values close to 1 indicate a very good fit.

6 Parsimony Normed Fit Index

The Parsimonious Normed Fit Index (PNFI) is the result of applying the parsimony adjustment James et al (1982) to the NFI:

\[
\text{PNFI} = \frac{\text{NFI}}{\text{PRATIO}} = \frac{\text{NFI} \cdot d}{d_b} \tag{3.5}
\]

where \( d \) is the degrees of freedom for the model being evaluated, and \( d_b \) is the degrees of freedom for the baseline model.

7 Parsimony Comparative Fit Index

The Parsimony Comparative Fit Index (PCFI) is the result of applying the parsimony adjustment to the Comparative Fit Index.
\[ P_{CFI} = (CFI)(PRATIO) = CFI \frac{d}{d_b} \]  

(3.6)

where \( d \) is the degrees of freedom for the model being evaluated, and \( d_b \) is the degrees of freedom for the baseline model.

8 Root Mean Square Error of Approximation

Root Mean Square Error of Approximation (RMSEA) has recognized as one of the most informative criteria in covariance structure modeling and takes into account the error of approximation in the population.

\( F_0 \) incorporates no penalty for model complexity and will tend to favour models with many parameters. In comparing two nested models, \( F_0 \) will never favor the simpler model. Steiger and Lind (1980) suggested compensating for the effect of model complexity by dividing \( F_0 \) by the number of degrees of freedom for testing the model. Taking the square root of the resulting ratio gives the population "root mean square error of approximation", called RMSEA by Steiger and Lind, and RMSEA by Browne and Cudeck (1993).

\[ \text{Population RMSEA} = \sqrt{\frac{F_0}{d}} \text{ estimated RMSEA} \sqrt{\frac{F_0}{d}} \]  

(3.7)

Rule of thumb

"Practical experience has made us feel that a value of the RMSEA of about .05 or less would indicate a close fit of the model in relation to the degrees of freedom. This figure is based on subjective judgment. It cannot be regarded as infallible or correct, but it is more reasonable than the requirement of exact fit with the RMSEA = 0.0. We are also of the opinion..."
that a value of about 0.08 or less for the RMSEA would indicate a reasonable error of approximation and would not want to employ a model with a RMSEA greater than 0.1."

9 Discriminant Function Analysis

Discriminant Function Analysis attempts to construct a function with these and other variables so that the respondents belonging to either of these two groups are differentiated at the maximum. The linear combination of the variables is known as Discriminant Function and its parameters are called Discriminant Function coefficients.

A typical Discriminant Function will be of the form,

\[ Z = a_0 + a_1X_1 + a_2X_2 + \ldots + a_nX_n \] (38)

where, \(a_0\) - constant

\(a_1, a_2, \ldots, a_n\) - Discriminant Function coefficients of the independent variables \(X_1, X_2, \ldots, X_n\) respectively.

10 Factor Analysis

Factor loading represents the correlation between an original variable and its factor. It is a rule of thumb used frequently as a means of making a preliminary examination of the factor matrix. In short, a factor loading are greater than plus or minus 0.30 is considered to meet the minimal level, and if the loadings are 0.50 or greater, they are considered practically significant. In determining a significance level for the interpretation of loadings, an approach similar to determining the statistical significance of correlation coefficients can be used.
11 The t-statistics

The t test assesses the statistical significance of the difference between two independent sample means. To determine whether the two sample means are viewed differently, a t-statistics is calculated. The t-statistics is the ratio of the difference between the sample means to their standard error. The standard error is an estimate of the difference between means to be expected because of sampling error, rather than real differences between means. This can be shown in the equation

\[ t\text{-statistics} = \frac{\mu_1 - \mu_2}{SE_{\mu_1, \mu_2}} \]  

(39)

where

1 = mean of group 1

2 = mean of group 2

\( SE_{12} \) = Standard error of the difference in group means

If the t-value is sufficiently large, then statistically it can be said that the difference is not due to sampling variability, but represents a true difference.

12 Analysis of Variance

In the study, the one-way Analysis Of Variance (ANOVA) has been administered to find out the association between the demographic profiles of the Respondents and the Service Quality factors like Tangibility, Reliability, Responsiveness, Assurance, Empathy and Competence, Customer Satisfaction and Customer Loyalty.
\[ F = \frac{SS_c}{SS_{error} / (N-c)} = \frac{MS_c}{MS_{error}} \]  

(3.10)

where

\[ SS_c = \sum_{j=1}^{\hat{c}} n(\bar{Y}_j - \bar{Y})^2 \]

\[ SS_{error} = \sum_{j=1}^{c} \sum_{i=1}^{n_j} (\bar{Y}_{ij} - \bar{Y})^2 \]

\[ Y_j \quad \text{Individual observation} \]
\[ Y_j \quad \text{Mean for category (j)} \]
\[ Y \quad \text{Mean over the whole sample, or grand mean} \]
\[ Y_{ij} \quad \text{i}^{th} \text{observation in the j}^{th} \text{category} \]
\[ C \quad \text{Number of independent variables or groups} \]
\[ N \quad \text{Total sample size (nxC)} \]

The 'F' statistics follows the F distribution, with (c-1) and (N-c) degree of freedom.

13 **Multiple Regression Analysis**

Multiple Regression is mainly building an equation wherein the predictor variables' (independent variables) coefficients are found out. The general Multiple Regression equation is of the form,

\[ Y = a_0 + a_1 X_1 + a_2 X_2 + \ldots \ldots + a_n X_n \]  

(3.11)

where  

\[ Y, \text{ the dependent variable} \quad a_0, \text{ constant} \]

\[ a_1, a_2, \ldots, a_n \text{ are the regression coefficients for the independent variables } X_1, X_2, \ldots, X_n \text{ respectively.} \]